REMARKS

This Amendment submitted in response to the non-final Office Action dated May 24, 2007, is believed to be fully responsive to the points of rejection raised therein.

Claims 1, 13 and 25 have been amended. Upon entry of the amendments, claims 1-36 will be pending in the present patent application. Applicant respectfully requests reconsideration and allowance of all pending claims in light of the above amendments and following remarks offered in response to the Office Action.

Claim Objections

The Examiner objected to Claims 1-8, 13-21 and 25-33 on the grounds that the recited claimed limitations were unclear. Applicant has amended Claims 1, 13 and 25 to clarify the limitations recited in these claims. No new matter has been added, and support for the amendment can be found, for example, in numbered paragraph [0054] in the present patent application. Accordingly. Applicant requests that the Examiner reconsider and remove the objections to Claims 1-8, 13-21 and 25-33.

Rejections Under 35 U.S.C. 103

Claims 1-8 and 10-36 were rejected under 35 U.S.C 103(a) as being unpatentable over U.S Patent No. 7,039,554 (hereinafter, "Nguyen") in view of U.S Patent No. 5,703,283 (hereinafter, "McClish"). For a *prima facie* case of obviousness, the Examiner must set forth the differences in the claim over the applied reference, set forth the proposed modifications of the references, which would be necessary to arrive at the claimed subject matter, and explain why the proposed modification would be obvious.

Applicant respectfully submits that the applied references, either alone or in combination, do not teach, disclose or suggest all the features recited in the independent Claims 1, 10, 12, 13, 22, 24, 25, 34 and 36. Specifically and for at least the reasons discussed below, none of the references teach, disclose or suggest a system and method for performing engine baseline modeling, comprising an engine baseline modeling component that applies a smoothing algorithm to an initial engine baseline model to

generate a smoothed effect, eliminates the smoothed effect from the initial engine baseline model to isolate a plurality of deterioration time effects on a measured parameter and removes the deterioration time effects from the initial engine baseline model to generate a detrended engine baseline model, as recited in Claims 1, 13 and 25. In addition and for at least the reasons discussed below, none of the references teach, disclose or suggest a system and method for performing engine baseline modeling, comprising a data segmenting component that segments engine data into a plurality of groups and an engine baseline modeling component that identifies correlated groups of engine data based upon the initial engine baseline model and further combines data from correlated groups, as recited in claims 10, 22 and 34. Furthermore and for at least the reasons discussed below, none of the references teach, disclose or suggest a system and method for performing engine baseline modeling, comprising an engine baseline modeling component to identify segments relating to related engines, as recited in claims 12, 24 and 36. Accordingly, the combination of references cannot possibly include these features of the claims, and thus cannot render the claims obvious.

Claims 1, 13, 25 and claims depending therefrom

Nguyen discloses a method and system for gas turbine engine performance parameter trend detection and analysis. Engine performance data, including engine parameters, are gathered to monitor the health and performance of the engine, and the baseline datum against which each parameter is to be evaluated, is determined. The data is then filtered/smoothed to remove any extraneous or outlying data points and the filtered data is compared to its relevant baseline to determine the variance of the data from the baseline. The variance data from the parameters are analyzed and compared to known engine conditions to determine the existence of a particular performance condition (such as, for example, an engine malfunction or a performance deterioration). See, Nguyen, Col. 5, lines 16-43.

Applicant respectfully submits that the method and system for gas turbine engine performance parameter trend detection and analysis disclosed in Nguyen is not equivalent

or even similar to a system and method for performing engine baseline modeling as disclosed and claimed in the present patent application.

In particular, Applicant has carefully reviewed the sections, Figures 5 & 6 and Col. 5, lines 50-67 and Figures 1 and Col. 8, lines 4-53 and Fig. 7, item #106 "DATA SMOOTHER" cited by the Examiner in Nguyen and submits that these sections do not disclose an engine baseline modeling component that applies a smoothing algorithm to an initial engine baseline model to generate a smoothed effect, and further eliminates the smoothed effect from the initial engine baseline model to isolate a plurality of deterioration time effects on a measured parameter and removes the deterioration time effects from the initial engine baseline model to generate a detrended engine baseline model, as recited in Claims 1, 13 and 25. Instead, the cited sections only disclose that engine performance data is processed to generate filtered/smoothed data. Further, the cited sections disclose that prior to smoothing the data, the raw data is normalized to remove its dependence on environmental factors by calculating the difference between each data point in each data signal and its respective expected value. In addition, the cited sections disclose that the smoothing of the data is achieved using a weighted average and regression technique.

Clearly, in Nguyen, any smoothing of data is performed only to remove any extraneous or outlying data points in the data so that the smoothed data can be compared with a baseline to determine the existence of a particular performance condition in the engine. Specifically, in Nguyen, the smoothed/filtered data is compared to its relevant baseline to determine the variance of the data from the baseline. The variance data from the parameters is then analyzed and compared to known engine conditions, in order to determine the existence of a particular performance condition (such as, for example, an engine malfunction or a performance deterioration).

In contrast, in the present patent application, the initial engine baseline model is smoothed, to take into consideration time varying effects on measured parameters and to determine a revised baseline model of the detrended data. Specifically, a smoothing algorithm is applied to an initial engine baseline model to generate a smoothed effect and

the smoothed effect is eliminated from the initial engine baseline model to isolate a plurality of deterioration time effects on a measured parameter. The deterioration time effects from the initial engine baseline model are then removed to generate a detrended engine baseline model. See, for example, Claim 1 of the present application.

In particular, in accordance with the present patent application, the initial baseline model is subjected to a smoothing algorithm to reduce variations in identified trends in the measured/modeled engine data and parameters. Once the initial model has been smoothed, the smoothed effect is then eliminated from the initial baseline model to remove or reduce its effect on the measured residuals. In other words, by smoothing the initial engine baseline model to remove or reduce trend variations, the remaining model represents only deterioration time effects on the measured parameter. Once these effects are isolated, they are removed from the initial model to generate a detrended baseline model. See, e.g., Application, paragraph [0054], lines 7-15.

Further, there is no motivation in Nguyen to combine it with McClish, in the manner suggested by the Examiner. McClish discloses a method for detrending engine positional data. Applicant has carefully reviewed the material in section Col. 4, lines 14-21 and the title and the abstract cited by the Examiner in McClish and submits that the above material merely discloses that positional encoder data is acquired over a plurality of consecutive engine revolutions and a trend in the acquired positional data identified. Then, corrected positional encoder data is generated depending on removing the identified trend. See, McClish, Abstract. One skilled in the art would therefore conclude that McClish appears only to disclose a technique for generating corrected positional encoder data based on removing identified trends. Accordingly, Applicants respectfully submit that Nguyen and McClish fail to teach or suggest generating a de-trended engine baseline model as claimed in the present patent application.

Applicant interprets the Office Action as stating that the proposed modification is to use the detrending method of McClish in combination with the smoothing methods of Nguyen to obtain an improved data result. However, and for the reasons presented above,

Applicant respectfully submits that the applied references merely disclose techniques for comparing smoothed data with a baseline to determine the existence of particular engine performance conditions (Nguyen) and techniques for generating corrected positional encoder data based on removing identified trends (McClish), respectively.

Consequently, no combination of the references could render such inventive features obvious. In view of the above-noted distinctions, Applicant submits that claims 1, 13 and 25 are neither the same as, nor in any way taught or suggested by Nguyen and McClish taken either singly or in combination. In view of the foregoing deficiencies in the teachings of the prior art, the references cannot establish a *prima facie* case of obviousness of claims 1, 13 and 25. Accordingly, these claims are believed to be clearly patentable over the cited combination. Their reconsideration and allowance is respectfully requested. Dependent claims 2-8, 14-21 and 26-33 depend from presumably allowable independent claims 1, 13 and 25. Accordingly, these claims are believed to be clearly patentable over the cited combination. Their reconsideration and allowance is requested.

Claims 10, 22, 34 and claims depending therefrom

Applicants respectfully submit that Nguyen does not disclose, teach or suggest a system and method for performing engine baseline modeling, comprising a data segmenting component that segments engine data into a plurality of groups and an engine baseline modeling component that identifies correlated groups of engine data based upon an initial engine baseline model, wherein the engine baseline modeling component further combines the data from correlated groups.

Applicant has carefully reviewed the material in Figs. 5 and 6 cited by the Examiner in Nguyen and submit that these Figures do not disclose a data segmenting component that segments engine data into a plurality of groups and an engine baseline modeling component that identifies correlated groups of engine data based upon an initial engine baseline model, wherein the engine baseline modeling component further combines the data from correlated groups. Instead, these Figures merely disclose examples of

engine performance parameters and further disclose that the engine performance data may be processed to generate filtered/smoothed data. One skilled in the art would therefore conclude that Nguyen appears only to disclose a technique to process engine performance data in order to generate filtered/smoothed data.

In accordance with the present patent application, the engine baseline modeling system and method determines correlations between various types of engine data, and the trends resulting from the correlated data types are combined to reduce the effect of noise in the overall model, while preserving the important characteristics of the results. See, e.g., Application, paragraph [0056], lines 6-9.

McClish similarly fail teach this recited feature, and indeed, the Examiner did not rely upon McClish for teaching a data segmenting component that segments engine data into a plurality of groups and an engine baseline modeling component that identifies correlated groups of engine data based upon an initial engine baseline model, wherein the engine baseline modeling component further combines the data from correlated groups.

Consequently, no combination of the references could render such inventive features obvious. In view of the above-noted distinctions, Applicant submits that claims 10, 22 and 34 are neither the same as, nor in any way taught or suggested by Nguyen or McClish taken either singly or in combination. In view of the foregoing deficiencies in the teachings of the prior art, the references cannot establish a *prima facie* case of obviousness of claims 10, 22 and 34. Accordingly, these claims are believed to be clearly patentable over the cited combination. Their reconsideration and allowance is respectfully requested. Dependent claims 11, 23 and 35 depend from presumably allowable independent claims 10, 22 and 34. Accordingly, these claims are believed to be clearly patentable over the cited combination. Their reconsideration and allowance is requested.

Claims 12, 24, 36 and claims depending therefrom

Applicants respectfully submit that Nguyen does not disclose, teach or suggest a system and method for performing engine baseline modeling, comprising an engine baseline modeling component to identify segments relating to related engines as recited in claims 12, 24 and 36. Applicant has carefully reviewed the material in Figs. 5 and 6 cited by the Examiner in Nguyen and submit that these Figures do not disclose an engine baseline modeling component that identifies segments relating to related engines. Instead, these Figures merely disclose examples of engine performance parameters and further disclose that the engine performance data may be processed to generate filtered/smoothed data. One skilled in the art would therefore conclude that Nguyen appears only to disclose a technique to process engine performance data in order to generate filtered/smoothed data.

In accordance with the present patent application, the engine baseline modeling component is configured to develop baseline models for pairs or groupings of engines. In particular, baseline models are developed for pairs of engines to improve the accuracy of the model by considering operational conditions and outputs for the paired system as a whole. See, e.g., Application, paragraph [0062], lines 6-12.

McClish similarly fail teach this recited feature, and indeed, the Examiner did not rely upon McClish for teaching an engine baseline modeling component that identifies segments relating to related engines.

Consequently, no combination of the references could render such inventive features obvious. In view of the above-noted distinctions, Applicant submits that claims 12, 24 and 36 are neither the same as, nor in any way taught or suggested by Nguyen or McClish taken either singly or in combination. In view of the foregoing deficiencies in the teachings of the prior art, the references cannot establish a *prima facie* case of obviousness of claims 10, 22 and 34. Accordingly, these claims are believed to be clearly patentable over the cited combination. Their reconsideration and allowance is respectfully requested. Accordingly, these claims are believed to be clearly patentable over the cited combination. Their reconsideration and allowance is requested.

In view of the remarks and amendments set forth above, Applicant respectfully requests allowance of the pending claims.

Please charge all applicable fees associated with the submittal of this Amendment and any other fees applicable to this application to the Assignee's Deposit Account No. 07-0868.

Should the Examiner believe that anything further is needed to place the application in even better condition for allowance, the Examiner is requested to contact Applicant's undersigned representative at the telephone number below.

Respectfully submitted,

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